Surface Radiation Budget (SRB) Langley DAAC Project/Campaign Document

Summary:

Surface radiation budget data have the potential for contributing significantly to improved understanding of the four major components of the climate system: the oceans, the land surface, the cryosphere, and the atmosphere. Radiative fluxes into the ocean surface provide an important boundary forcing for the ocean general circulation. Furthermore, since the radiative fluxes into the ocean surface are significantly modulated by boundary layer parameters (e.g., clouds, atmospheric humidity, and temperature), SRB may be an important factor in air-sea interactions. With respect to the land surface, the net radiative balance governs the turbulent fluxes of latent and sensible heat from the surface into the atmosphere. Surface radiative fluxes are also needed for studies related to the energy and water balance of plant canopies. For the cryosphere, the pack ice and its interaction with surface temperature and solar radiation provides the so-called ice-albedo feedback which is a vital component governing climate trends on decadal to longer time scales. Finally, the knowledge of SRB together with top-of-atmosphere Earth radiation budget data can yield, for the first time, observational estimates of tropospheric radiative heating and cloud radiative forcing.

Table of Contents:

1. Project/Campaign Overview:

Name of Project/Campaign:

Surface Radiation Budget (SRB)

Project/Campaign Introduction:

See Summary.

Project/Campaign Mission Objectives:

The mission objectives of SRB are to use the ISCCP C1 data supplemented with ERBE data as input to the SRB satellite algorithms to estimate various top-of-atmosphere and surface parameters. Where GEBA data are available and determined by Satellite Data Analysis Center (SDAC) to be accurate, it is compared with both algorithm's calculation of downward shortwave irradiance at the surface.

Discipline(s):

Earth Science

Geographic Region(s):

Global.

Detailed Project/Campaign Description:

The Surface Radiation Budget (SRB) data sets are derived from a variety of data sources. The primary data source is the International Satellite Cloud Climatology Project (ISCCP) C1 data product. Using the ISCCP C1 parameters as input, SRB results are generated using two different algorithms. The Pinker algorithm (developed jointly by Drs. R.T. Pinker and I. Laszlo form the University of Maryland) is a physical

model which uses an iterative procedure based on delta-Eddington radiative transfer calculations. The Staylor algorithm (developed by Mr. W.F. Staylor from the NASA Langley Research Center) is a parameterized physical model in which both cloud and aerosol transmission characteristics have been separately tuned to historical data at various locations around the globe. Earth Radiation Budget Experiment (ERBE) data are also used as input to the models, as well as for top-of-atmosphere (TOA) irradiance comparisons with the Pinker Model output. The Swiss Federal Institute of Technology, Zurich, provides ground-truth fluxes from the Global Energy Budget Archive (GEBA). These data are used for validation of the Pinker and Staylor calculated downward shortwave surface irradiances. SRB uses the same equal area grid system as that used by ISCCP for its C1 product. The equal-area grid contains 6596 cells covering the globe; where a cell is approximately 280 km x 280 km at the equator.

2. Data Availability:

Data Type(s):

All data currently archived at the Langley DAAC are in Hierarchical Data Format (HDF).

Input/Output Media:

Data are available via FTP from the Langley DAAC.

Proprietary Status:

There is no proprietary status for the data sets currently on-line at the Langley DAAC.

3. Data Access:

Data Center Location and Contact Information:

Langley DAAC User and Data Services Office
NASA Langley Research Center
Mail Stop 157D
Hampton, Virginia 23681-2199
USA
Telephone: (757) 864-8656
FAX: (757) 864-8807
E-mail: support-asdc@earthdata.nasa.gov

Associated Costs:

Currently, there is no charge for data.

4. Principal Investigator Information:

Investigator(s) Name and Title:

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5. Submitting Investigator Information:

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6. References:

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7. Glossary and Acronyms:

EOSDIS Acronyms (PDF).

ERBE - Earth Radiation Budget Experiment
GEBA - Global Energy Budget Archive
ISCCP - International Satellite Cloud Climatology Project
URL - Uniform Resource Locator

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